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ABSTRACT

The secondary school principal of a large Model Schools Project (MSP) urban school (1) examines the communication characteristics of the school, and (2) evaluates a communication instrument with respect to its possible general use as an administrative tool to help administrators examine the effectiveness of the communication characteristics of their organization. A sociometric questionnaire, listing the total school professional staff, was administered to each professional staff member. Each respondent was asked to mark the nature of his verbal contact with the total professional staff with respect to the following categories: (1) frequency of contact, (2) subject matter, and (3) importance of contact. Data from three administrations of the questionnaire covering a two-year period were compared and analyzed. (Author/MLF)

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THE COMMUNICATION STRUCTURE OF A LARGE URBAN SECONDARY SCHOOL

by Richard L. Taylor

The school principal is the administrator of a complex social system. He is accountable for the most part for its effectiveness even though in many instances some variables which determine effectiveness in a given situation may be beyond his control. His position in the organization, the complexity of the organization, the lack of skills and tools, his own leadership style often prevent him from being able to understand the organization as it de facto operates or how he can be effective as its administrator.

The problem is further compounded because criteria of organizational effectiveness are often not explicit, or where explicit--difficult to measure, or when measurable--difficult to interpret.

Communication in a complex organization is vital to the effective functioning of that organization. The principal of a school is in a key position to influence the nature of what is communicated and how it is communicated if he understands the unique communication characteristics of the particular institution he heads.

The study described here was an attempt on the part of a secondary school principal of a large (1700 students) urban school to (1) examine critically the communication characteristics of the school, and (2) evaluate a communication instrument with respect to

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its possible general use as an administrative tool to help administrators examine the effectiveness of the communication characteristics of their organization.

Theoretical Context

Organizational theorists (Homans, 1950; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Likert, 1961; Trist, Higgin, Murray & Pollock, 1963) describe an organization as a socio-technical system which includes not only a technology but a socio-system which includes the values, needs, norms and expectations of the people who do the work. The current study attempted to examine the communication relationships between pairs of individuals. The assumption was made that these relationships went beyond the technically stated relationships of the organizational chart and that the knowledge of such relationships would give some indication of the complexity of getting work accomplished.

The theorists suggest that the boundaries between the socio-system and the technical system are not fixed. Communication between pairs of workers, for example, may seldom consist of totally task oriented or totally socially oriented talk but will vary in content and intent depending on the needs of the organization and the needs of the individual.

The underlying assumptions concerning the method used here in studying organizational structure was stated by Jacobson and Seashore (1951):

> (1) "Organizational structure" can be conceptualized in terms of communication events which connect pairs of individuals, and thus establish patterns of contact among

individuals and among groups.

(2) Communication events when repeated tend to take on a characteristic form as to structure, function, content, psychological concomitants, and other properties.

(3) The relationships between individuals, as reflected in such characteristic communication events, are appropriate and useful units for data-gathering and analysis in connection with the study of organizational structure and communication patterns in an organization (32-33).

Statement of the Problem

The study proposed to answer the following questions:

1. What are the communication characteristics of Rainier Beach Junior Senior High School with respect to:
   a. Quantity of conversation (the number of daily contacts indicated) with respect to communication among all professional staff; horizontal communication (teacher to teacher); and vertical communication (staff to administrator).
   b. Context (number of times the specific subject of the Model Schools Project was checked as a topic of conversation).
   c. Networks (kinds of nets, number of liaison contacts, number of isolates and near isolates).
2. What changes took place in these characteristics over the time span of one year?
3. What events or conditions may account for the communication characteristics?
4. What events or conditions might account for the changes or lack of changes?

5. What is the relationship of the number (frequency) of contacts and the perceived importance of those contacts?
6. Does the relationship between frequency and importance change if only subordinate-superordinate contacts are considered?
7. Does this kind of communication analysis have general utility for use by administrators in formulating decisions concerning organizational structure and what is the cost?

Research Methodology and the School Setting

Research concerning communications in organizations and organizational effectiveness is primarily descriptive. Statements about communication tend to have a "common sense" validity (fewer isolates are better than more isolates). However, the validity of each statement involves the nature of the organization and the goals of the organization. A totalitarian organization, for instance, may be more effective as the number of isolates increases and as communication becomes more controlled.

Several aspects of this study are peculiar to Rainier Beach Junior Senior High School (the setting, the Model Schools Project); however, the methodology is generalizable to any institution that is capable of administration of a similar questionnaire.

Listed below is an overview of the steps of the study, followed by a more detailed description of the sociometric questionnaire,

the primary data source.

1. The investigator developed a background description indicating the general setting under which the study took place.
2. A sociometric questionnaire was prepared which would provide data for the analysis of the communication characteristics.
3. The sociometric questionnaire was administered to all professional staff at the beginning of the school year. Respondents were requested to respond to the communication categories as they occurred during the previous school year.
4. The questionnaire was administered again in December; however, the respondents were requested to respond with respect to the communication categories as they occurred in the time between the two questionnaires.
5. A final administration of the questionnaire occurred in April. Directions were similar to the December questionnaire.
6. Data from all three administrations of the questionnaire were compared and analyzed.

The Questionnaire

The sociometric questionnaire developed (see Exhibit 1), consisted of a mimeographed sheet on which the names of the total school professional staff were listed in the left hand column. Names were grouped on the questionnaire according to departmental

or work groups. Each respondent was asked to mark the nature of his verbal contact with the total professionsl staff with respect to the following categories: (1) Frequency of contact, (2) Subject matter, and (3) Importance of contact.

The Institutional Setting

The following is an account of the general setting in which the study was conducted. It is followed by a chronological listing of some events and characteristics which were considered to have a possible infiuence on the communication characteristics of the school.

Rainier Beach Junior Senior High School

Rainier Beach Junior Senior High School was opened the school year of 1960-61. It was originally constructed to house 1200 students in a traditional secondary school program. By the late sixties, the student population had grown to 2200 students; the overload was housed in 22 portable structures located on the same campus.

During the school year 1967-68, the Southeast Education Center (SEEC) was formed. Rainier Beach and the feeder elementary schools were set up as schools in a pilot project of the Seattle Public Schools to implement individualized instruction: articulated K-12.

In the spring of 1969, Rainier Beach was selected as one of the Model Schools Project "category one" schools. The Model Schools Project (MSP) concepts required considerable changes in

administrative, instructional, and learning formats. In the summer of 1969, this writer was appointed principal of the school. A new assistant principal, a new associate principal, and two new deans of students were appointed.

Following is a chronological listing of several incidents which were considered by the writer as incidents which may have influenced the communication structure, the frequency of communication, and conversation concerning the Model Schools Project. Following this listing is a list of conditions that were similarly considered to have possible influence on the communication characteristics.

Critical Incidents

1. Invasion by Black Panthers ..... Fall 1968
2. Continued racial unrest 1968-69
3. Accepted into Model Schools Project ..... Spring 1969
4. Tactical squad of Seattle Police Department called in to quell racial problem ..... June 1969
5. Summer Workshop to help staff understand MSP concepts ..... August 1969
6. New administrative staff appointed .... September 1969
7. Racial unrest ..... September-November 1969
8. Formulation of Faculty Senate ..... Fall 1969
9. Three student activist rallies ..... March-April 1970
10. Staff reduction due to loss of seventh grade to middle school ..... Summer 1970
11. Reorganization of classroom assignments on a departmental basis ..... Summer 1970
12. Principal assumes active role in Instructional Council 1970-71

13. First communication questionnaire given ..... September 1970

14. Article in student paper relative to Model Schools Project 1970-71

15. Instructional Council planning workshop relative to Model Schools Project implementation ..... November 1970

16. Closed circuit TV telecast to all students and staff relative to year around school and continuous progress ..... December 1970

17. Workshop (staff given released time) with small groups of total staff relative to implementation of MSP ..... December 1970

18. Period conferences relative to MSP ..... January 1971

19. Staff vote to reconsider MSP staffing model (ad hoc committee set up) ..... January 1971

20. Committee set up to study problems of implementation of teacher-counselor role ..... Winter-Spring 1971

21. Seattle Federation of Teachers and Seattle Alliance of Educators involved in jurisdictional dispute ..... Spring 1971

Staff Characteristics

1. History of relatively small amount of staff turnover.

2. Four husband-wife combinations on staff.

3. Established and traditional role relationships.

4. Work areas concentrated for some work groups, isolated for others.

5. Common faculty rest and eating area.

6. Common language for coding process.

Analysis of the Communication Questionnaire

Three kinds of analyses were used: one involved a

sociometric matrix and sociographic analysis of the communication nets; a second provided an analysis of some relationships between importance of contact and frequency of contact (Pearson Product Moment Correlation); and a third measured the changes among the three administrations of the questionnaire of total, vertical, and horizontal communication, in addition to the changes in the number of isolates and near isolates, the number of liaison contacts, and the number of times the Model Schools Project was checked. Changes were measured using analysis of variance trend analysis (Edwards, 1968).

Sociometric Analysis

The analysis of the sociometric data used in this study was suggested by Festinger (1949), Luce and Perry (1949), and Festinger, Schacter and Black (1950). McCleary (1957) applied Festinger's analysis with some modification to analyze the communication nets in a high school staff. Lin (1968) in studying the communication characteristics of three elementary schools developed a computer program building on Festinger's earlier methods.

The method used in this study was as follows:

1. Sociometric data were obtained from the professional staff of Rainier Beach Junior Senior High School through administration of a questionnaire. Names of persons were elicited from respondents indicating the nature of the communication contacts between themselves and other professional staff members.

2. A N x N matrix was formed from these data by converting names to numbers and placing the number of each respondent in a

column in the left margin of a matrix and the number of the nominated persons in a row across the top of the matrix. The questionnaire required that a respondent react to five kinds of contact frequency: several times daily, daily, two or three times a week, several times monthly and several times a year. For purposes of this study the matrices were developed using the daily and several times daily columns only. This decision was somewhat arbitrary; however, it was surmised that daily contact and several times daily contact did, in fact, establish a more than casual communication relationship. Put another way, the first two categories are the only two available which would indicate that information (a message, rumor) could be diffused within a day's time. A plus mark(+) was placed in the row and column corresponding to the respondent and the persons he nominated; that is, if person 5 nominated persons 1, 3, and 4, a plus mark (+) appeared in columns 1, 3, and 4 in the row numbered 5. Cells corresponding to persons not nominated were left blank. The resulting matrix was subject to the rules of matrix multiplication.

3. The matrix thus formed was used to make a symmetrical submatrix of mutual choices (person 5 nominated person 12 and person 12 nominated person 5). These matrices were used to obtain the data used to tabulate reciprocated contacts for total, horizontal, vertical, and liaison. They also provided the basis for the analysis of the communication networks and the development of sociograms.

4. The symmetrical matrix was squared, cubed and raised to higher powers until a 50% saturation of the matrix was reached.[1]

5. The matrices for each administration of the questionnaire (step 2) were analyzed for the presence of isolates and near isolates, and liaison persons. The frequency that each person was chosen by others was obtained for all professional staff. The mean and standard deviation of the number of choices per individual were computed.

Liaison. Liaison refers to the coordination of information between groups. Liaison persons are those that perform the above function between two groups. For purposes of this study, any person who had reciprocated contact with a person outside his work group was considered to be a liaison person.

A person may be connected to several groups; the more groups, the more the liaison.

The trends of change over the three measured periods for the amount of liaison (the increase or decrease in number of groups to which a person was connected) was measured by assigning the number one to an individual connected with one group other than his own work group. A two was assigned for two other groups, a three for three, etc. The data were compared using analysis of variance trend analysis.

Isolates and near isolates. Isolates were defined as persons who had no daily contact as indicated by the response of others. Near isolates were defined as those persons chosen fewer times than one standard deviation beyond the mean. A zero was assigned to each member who was not an isolate or near isolate and a one was assigned to each person who was either an isolate or a

NAME _____ PERSONAL CONTACT SHEET

The Number After Your Name _____

Fill out the questionnaire below as you recall the number and kinds of contacts you made with your colleagues last year. Skip over any persons you did not contact at all.

* * * \

near isolate. The data were compared over the three administrations of the questionnaire using analysis of variance trend analysis.

Analysis of Relationships and Frequencies and Changes Over Time

Several kinds of relationships and frequencies were available from the questionnaire data.

1. Amount of contact and changes in these contacts with respect to total contact, horizontal contact, and vertical contact were studied. As with the formulation of the matrices, the contact categories selected from the questionnaire included the first two categories (daily and several times daily) only.

Total contact. The reciprocated contacts of all respondents were tabulated from the symmetrized matrices for each administration of the questionnaire. These data were compared using analysis of variance trend analysis.

Horizontal contact. The amount of horizontal contact (teacher to teacher contact) was obtained for every teacher respondent over the three administrations of the questionnaire using reciprocated contacts tabulated from the symmetrized matrices. These data were compared using analysis of variance trend analysis.

Vertical contact. The amount of vertical contact (staff to administrator) was obtained using reciprocated contacts tabulated from the symmetrized matrices for each respondent over the three administrations of the questionnaire. These data were compared using analysis of variance trend analysis.

2. The relationship between frequency of contact and

importance of contact was compared with respect to two situations: teacher-teacher and teacher-administrator. The questions were: If teacher "a" indicates frequent contact with teacher "b", would he also consider those contacts as important? Would infrequent contacts be considered unimportant? Would the relationship be the same when teachers contacted administrators?

A numerical value ranging from 5 (several times daily) to 1 (several times a year) was assigned to the frequency of contact categories. A similar numerical value was assigned to the importance of contact variable (5 for "utmost" and 1 for "none"). The Pearson Product-Moment Correlation Coefficient was computed to test for correlation between frequency of contact and importance of contact between teachers. A similar computation was made comparing frequency of contact and importance of contact for teacher contact with the administrative staff.

3. The trends in amount of contact concerning the Model Schools Project were studied. The frequency that each respondent indicated that the Model Schools Project was included as a topic of any contact was tabulated over the three administrations of the questionnaire. These data were compared using analysis of variance trend analysis.

Summary

Findings

In general, the findings indicated:

1. A significant increase in the amount of communication

with respect to total, horizontal and vertical contacts;

2. The number of liaison contacts between work groups increased significantly;
3. The number of isolates and near isolates remained constant;
4. There is a significant positive correlation between the amount of contact and the importance placed on that amount;
5. There is a significant positive correlation when teacher-administrator amount of contact--importance of contact is considered;
6. The communication network structure appeared to remain constant, and the network efficiency stabilized after the second measurement period; and
7. There was a significant increase in the frequency of reported conversations concerning the Model Schools Project.

Conclusions

The following conclusions appear to be warranted as a result of the study. The questions in the order they were presented (p.3) and the conclusions are listed below.

Question 1. What are the communication characteristics of Rainier Beach Junior Senior High School with respect to:
a. Quantity of conversation (the number of daily contacts indicated) with respect to communication among all professional staff; horizontal communication (teacher to teacher); and vertical communication (staff to administrator).

b. Context (number of times the specific subject of the Model Schools Project was checked as a topic of conversation).
c. Networks (kinds of nets, number of liaison contacts, number of isolates and near isolates).

Question 2. What changes took place in these characteristics over the time span of one year?

Conclusions Concerning Questions 1 and 2: It was possible to describe accurately or measure within the limitations of the study not only the communication characteristics described above but also the trends of change of those characteristics over time.

Question 3. What events or conditions may account for the communication characteristics?

Question 4. What events or conditions might account for the changes or lack of changes?

Conclusions Concerning Questions 3 and 4: It was not possible under the conditions of the study to make accurate, measurable statements concerning the above questions. It would appear, however, that statements concerning the relationship between specific response areas such as the Model Schools Project and the Model Schools Workshop have enough face validity for making decisions. Statements concerning the relationship between the efficiency of the networks of an organization and historical events or organizational conditions become much more difficult to make.

Question 5. What is the relationship of the amount (frequency) of contacts and the perceived importance of those contacts?

Question 6. Does the relationship between frequency and importance change if only subordinate-superordinate contacts are considered?

Conclusions Concerning Questions 5 and 6: It is clear that

for the institution studied the relationship between quantity of contact and importance was positive and significant with respect to both questions above. The relationship between subordinate-superordinate quantity-importance was considerably less, however, than when all responses were considered.

Question 7. Does this kind of communication analysis have general utility for use by administrators in formulating decisions concerning organizational structure and what is the cost?

Conclusions Concerning Question 7: The conclusions to be drawn from the study with regard to the first part of the above depend on how one answers certain other questions. The answer is an unqualified "yes" if the answers to the following are also "yes." Is it useful to know what the communication structure consists of in an organization? Is it useful to know how many isolates exist in an institution? Is it useful to know if and in what ways change occurs in the communication characteristics of an organization?

The cost of replicating the study would be nominal, however some changes in the basic questionnaire are advisable.

Implications

Several implications of direct concern to administrators and students of educational administration appeared to develop from the foregoing conclusions.

If it is possible to measure communication characteristics and measure change in those characteristics, if this appears to provide useful information concerning an organization, and if the cost of obtaining these data is nominal, then it follows that this

kind of data gathering should become an intergral part of organizational decison making.

These analyses also may very well provide students of administrative organization and central school administration personnel with a tool to help determine optimum (in terms of communication) size of schools, school organizational patterns, and space organization.

In short, the method provides a means of measuring communication effectiveness as a dependent variable and as such opens up several avenues for further research.

Specific implications indicated for Rainier Beach Junior Senior High School would appear to be that, assuming the propositions to be valid, several staff members and several work groups need to be drawn more closely into the communication structure of the organization. Informal channels do not appear to have been opened and the formal structure has not done the job.

The indicated solution for administration probably involves the need for more formal channels to be opened between the isolated persons and groups within the formal structure.

These conclusions suggest that respondents consider a high frequency of conversation to be highly important as well. The message for organizational communication then may well be that administration should spend more time in developing an understanding and acceptance of a given process or program (i.e., Model Schools Project) with highly communicative individuals--possibly even if this means less communication within the hierarchy.
(i.e., if "a" talks with a large number of people daily or several

times daily and these conversations tend to be considered important, then "a" may be predicted to be a better diffuser of information than "b" if "b" has fewer contacts. This may be true irrespective of the individual's place in the organizational hierarchy.)

FOOTNOTES

[1]Raising a matrix to higher powers in communication terms indicates that "n" communication steps exist between any two individuals where "n" equals the power of the matrix. Thus a squared matrix indicates two step connections between individuals. That is if "a" contacts "b" and "b" contacts "c", "a" may be said to have contact with "c" in two steps. Or "a" may be said to be related to "c" through one intermediary. (A matrix of power n may be considered to indicate the n-1 intermediaries between any two individuals.) Thus a matrix raised to the fifth power indicates a five step relationship between any two people or that two people are connected through four intermediaries.

A saturation index indicates the efficiency of the communication structure. (One hundred percent saturation could be reached by raising the matrix to higher and higher powers if no isolates exist in the organization.) An organization which reaches saturation with fewer power iterations may be said to be a more efficient communication system than one with more power iterations. Or, more appropriate for this study, an organization requiring fewer power iterations at one time than at another, may be said to be more efficient at that time. Charters (1969) suggested that it is not necessary to raise the matrix to 100% saturation in order to obtain a saturation index. He indicated that an arbitrary cut off of a lower saturation percentage would be equally useful and less costly. A 50% cut off level was selected for this study.

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